Investigating the Impact of Tumor Biology and Social Determinants on Time to Diagnosis and Stage at Presentation of Wilms Tumor
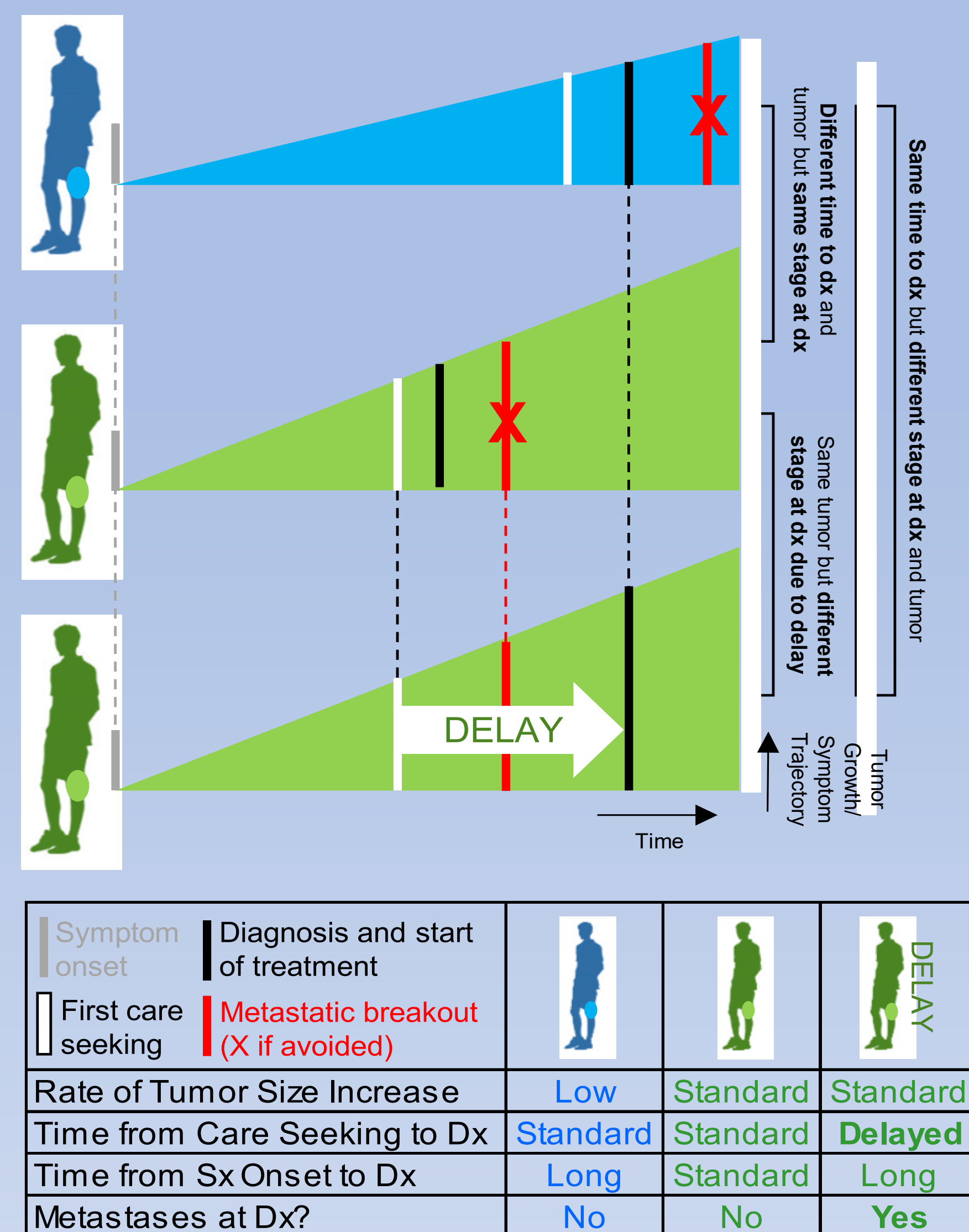
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Background:

-Socioeconomic factors affect overall survival of pediatric cancers
-Patients with metastasis have worse prognosis
-Tumor biology also plays a role
-Interplay between tumor biology and socioeconomic factors important in cancer diagnosis and treatment
-Leads to question of whether time to diagnosis and delay in diagnosis can be used interchangeably?

Hypothesis:

Time to diagnosis is a function of tumor biological aggressiveness, while delays in diagnosis make tumors more likely to present at a higher stage

	Low	Standard	Standard
Rate of Tumor Size Increase	Low	Standard	Standard
Time from Care Seeking to Dx	Standard	Standard	Delayed
Time from Sx Onset to Dx	Long	Standard	Long
Metastases at Dx?	No	No	Yes

Methods:

-306 charts reviewed from Children's Hospital Colorado
-Patient barriers identified from social work notes and doctor's notes
-Initial symptom to time of first medical visit and to date of diagnosis noted
-Staging at diagnosis
-Histology and LOH at time of diagnosis used as proxy for tumor biology
-Multivariable logistic regression

Results:

Patient Barriers	N	%
Race		
American Indian/Alaska Native	1	0.3
Asian	2	0.7
Black/African American	11	3.6
White	129	42.3
More than one race	4	1.3
Other	24	7.9
Unknown	134	43.9
Ethnicity		
Hispanic/Latino	40	13.1
Not Hispanic/Latino	130	42.6
Unknown	135	44.3
Primary Language		
English	183	60
Spanish	13	4.3
Unknown	109	35.7
Need Interpreter		
Yes	13	4.3
No	181	59.3
Unknown	111	36.4
Insurance		
CHP+	7	2.3
Indian Health Services	1	0.3
Medicaid	66	21.6
None	20	6.6
Private	93	30.5
Tricare	17	5.6
Unknown	101	33.1
Financial Need/Concern		
Yes	37	12.1
No	92	30.2
Unknown	176	57.7
Transportation Issues/Concern		
Yes	28	9.2
No	101	33.1
Unknown	176	57.7
Housing Concern		
Yes	31	10.2
No	98	32.1
Unknown	176	57.7
Single Parent Income		
Yes	29	9.5
No	100	32.8
Unknown	176	57.7
Complicated Medical History (Patient)		
Yes	12	3.9
No	118	38.7
Unknown	175	57.4
Divorced/Separated Parents		
Yes	17	5.6
No	112	36.7
Unknown	176	57.7
Family Medical Issues		
Yes	26	8.5
No	102	33.4
Unknown	177	58

Stage at diagnosis vs. patient barriers	No statistically significant results
Patient barriers vs. time to diagnosis from initial symptom	-Patients whose family faced housing concerns were more likely to be diagnosed greater than or equal to 9 days from the onset of symptoms compared to those who had no housing concerns (OR 10.37, 90% CI 1.18-91.31, P=0.077). -Patients with Medicaid were more likely to be diagnosed in greater than or equal to 9 days compared to those with private insurance (OR 2.09, 90% CI 0.94-4.63, P=0.129), while those who were uninsured were more likely to be diagnosed in 9 or more days from first symptom (OR 0.10, 90% CI 0.01-1.19, p=0.126)
Tumor biology vs stage	-Patients who had unfavorable histology/unknown were more likely to be diagnosed at stage 3 or 4 (OR 6.17, 90% CI 2.81-13.55, p<0.001) relative to those with favorable histology. -When estimating the odds of patients being diagnosed at stage 3 or 4 versus 1 or 2, patients with LOH had increased odds compared to those with no or unknown LOH (OR 1.86, 90% CI 0.91-3.80, p=0.153). Although this was not statistically significant, it was approaching significance at the level of p<0.01.

Discussion

-Social factors are more associated with symptoms and timing to medical care and diagnosis
  -Housing concerns may take precedence over health concerns leading
  -Medicaid and uninsured status may lead to increased time due to increased wait times for appointments or finding a doctor that takes Medicaid
-Tumor biology is more associated with stage than with timing of diagnosis
-The interplay between tumor biology, patient barriers, staging, and timing of diagnosis is more complex than our hypothesis

Future directions:

-Multiple study sites for larger sample size
-Ultimately interviewing patients rather than using chart as proxy for patient barriers
-Further investigation into tumor biomarkers for other cancers

Conflicts of Interest:

There are no conflicts of interest

References:

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